CHAPTER REPORTS

THE CORNELL CHAPTER

In addition to the list of officers and other data enclosed the following is a brief report of the activities of the Alpha Chapter during the year 1913-1914.

Ten public lectures were held, as follows:

Nov. 13, 1913. A Collecting Trip in the Colombian Andes, by Mr. J. T. Lloyd.

Dec. 8, 1913. Methods and Scope of Genetics, by Prof. A. W. Gilbert.

Jan. 12, 1914. The Electric Operation of Panama Canal Locks, by Mr. John W. Upp, of the General Electric Co.

Feb. 24, 1914. Some General Bearings of Embryology, by Dr. B. F. Kingsbury.

Feb. 3, 1914. Some Recent Investigations in Inorganic Chemistry, by Prof. A. W. Browne.

Mar. 11, 1914. The Physical Characteristics of Vowel Sounds, by Prof. D. C. Miller of the Case School of Applied Science.

March 30, 1914. Electric Waves and Wireless Telegraphy, by Prof. Ernest Merritt.

April 27, 1914. The Experimental Development of the Art of Sewage Disposal, by Prof. H. N. Ogden.

May 9, 1914. Some Phenomena of Coloration in Animals, by Mr. L. A. Fuertes.

May 25, 1914. Some Present Problems in Geometry, by Prof. Virgil Snyder.

At a meeting of the Chapter held May 9, 1914, the following were elected to membership:

FACULTY*

William E. Muldoon, D.V.M., Instructor Veterinary College.

P. Surgical Anasthesia. I. Several Problems in Pharmacology.

Elmer Seth Savage, B.S. in Agr., M.S. in Agr., Ph.D., Professor of Animal Husbandry.

A Study of Feeding Standards for Milk Production; Substitutes for Skimmed Milk in Raising Calves; Computing Rations for Farm Animals.

*Following each name is a list of research titles, in some cases only partially complete, indicating the work upon which nomination is primarily made, with symbols prefixed as follows: P—Published articles or books. C—Completed research not published. I—Incomplete research in progress.

Leroy Alonzo Wilson, M.E., Instructor in Experimental Engineering.

C. Friction Loss in Air Pipes under Low Pressures and Varying Velocities.

GRADUATE STUDENTS

Laura Gunn Davey, A.B.

C. Depth of Penetration of Kathode Rays in an X-Ray Target. (Thesis.)

Wheeler Pedlar Davey, A.B., M.S.

P. The mean depth at which Roentgen Rays originate within a Silver Target; The present Physical Knowledge of X-Rays; The Factors which Determine the Quantity of Radiation given off by an X-Ray Tube. (Thesis.)

Jehial Davidson, B.S. in Agr.

(No titles given.)

Henry Kennedy Davis, A.B., Assistant in Anatomy (Medicine).

I. Anomalies in the Thoracic Duct in Man.

Norman Bruce Davis, B.Sc., Assistant in Economical Geology.

P. Characters and Possible Origin of the Green Dolomites of New Ontaria. C. The Plasticity of Clay.

Roland Parker Davis, S.B., M.C.E.

P. Conservation of Plane Section in Concrete Beams; Strength of Cement Briquettes when Stored in Air; Proper Sands for Mortar and Concrete. C. Spread Foundations, including Footings of Steel Beam Grillages and of Reinforced Concrete.

Leonard Frederick Gieseker, B.Sc.

P. Investigations in Dry Land Agriculture. I. Investigation of Soil Toxins.

Harvey Nicholas Gilbert, B.S., Assistant in Chemistry.

P. Tests of the Edison Storage Battery; Laboratory Methods for making Acetamide. C. Color Lakes in Dyeing. (Thesis.)

Mabel Ensworth Goudge, A.B., A.M., Sage Fellow in Psychology.

C. On certain Cutaneous Illusions (Thesis); I. The Conative Theory of Ward and Stout.

John Benny Grumbein, B.S., M.E.

C. Measurement of Steam by the Venturi Meter. (Thesis.)

Connie Myers Guion, B.A., A.M.

C. Purine Metabolism in the Opossum and some other Mammals.

Alfred Carl Hottes, B.S., Assistant in Floriculture.
P. Experiments with Gladioli. C. A Study of the Cultivated Gladiolus. (Thesis.)

Horace Leonard Howes, B.S., Assistant in Physics.
C. On the Luminescence of Kunzite (with E. L. Nichols). I. On the Effects of Temperature and Concentration upon Fluorescence of Solutions.

J. Shirley Jones, B.S., Fellow in Agriculture.
P. Conditions Affecting the Production of Denatured Alcohol in the Northwest; Alaska Wheat Investigation; Chemical and Mechanical Analyses of characteristic Idaho Soils; Milling Properties of Idaho Wheat; Composition of Irrigated and Non-Irrigated Fruits. I. Investigation of the Cause of Lack of Fertility in certain Idaho Soils. (Thesis.)

Abigail Margaret Kincaid, A.B.
I. Fatigue in Muscle under Different Conditions.

Fred Edgar Klinck, M.E., Instructor in Experimental Engineering.
I. The Fundamental Principles underlying the Separation of Dust from Air. (Thesis.)

Alan Leighton, B.S., Assistant in Chemistry.
P. The Photosensitiveness of Fehling's Solution.

Alfred Erwin Livingston, B.S., M.S., Instructor in Medical College.
P. Effects of Castration on Weight of Pituitary in Rabbit; Relation of Gastro-Intestinal Tract and Contents to the Body Weight in the Rabbit; Effect of Thyroidectomy followed by Thyroid Feeding on Weight of Pituitary in Rabbits. I. Effect of Castration on Glands of Internal Secretion.

Henry Rupert John Myer, B.S., M.S., C.E.
I. Weirs with Shallow Approach Channels. (Joint thesis.)

Carleton Friend Miller, B.S., Assistant in Chemistry.
P. Study of a Small Carborundum Furnace.

William James O'Brien, B.Chem., Assistant in Chemistry.
P. The Determination of Phosphorus in Commercial Acetylene.

Carleton Elderkin Power, Instructor in Physics.
C. The Effect of Temperature on the Phosphorescence of certain Sulphides. (Thesis.)

William Jacob Robbins, A.B., Instructor in Botany (Agricultural).
P. Physiology of Fucus Sperms. I. Influence of Nutrient Salts on Diastatic Activity of Penicillium Camemberti.

George Jackman Sargent, B.S., Ph.D., Honorary Fellow in Chemistry.

P. Some Organic Compounds of Beryllium (joint author). C. Electrolytic Chromium.

Clarence McKinlay Sherwood.

C. Carbohydrate Media in Water Analysis; A Study of the Stokes Neutral Red Reaction; A Study of the Stokes Neutral Red Reaction as applied to the Sanitary Examination of Water. (Thesis.)

William Southworth, B.S.A.

P. Manuring of Meadow Land for Hay. I. A Study of the Hybridization of Medicoga Sativa L. and Medicago Lupulina L.

Frederick George Switzer, M.E.

C. Discharge Coefficients of a 90° notch Triangular Weir as a function of Water Temperature; Flow of Water over small Rectangular Weirs.

Charles Edwin Thomas, M.E.

I. The Specific Heat of Moist Air.

William Roy Wigley, M.E., Instructor in Expert Engineering.

I. Fatigue of Metals. (Thesis.)

James Kenneth Wilson, B.S., Instructor in Botany (Agriculture).

P. Inoculation and Lime as Factors in Growing Alfalfa (joint author); The Effect of certain Dairy Operations upon the Germ Content of Milk. C. Seed Sterilization (joint author); Physiological Studies of Bacillus Radicicola of Soy Bean.

Parkin Wong, A.B.

I. The Relation between the Vitrifying Points of Clays, and their Sag under Pressure at Different Temperatures; The Economic Geology of China.

SENIORS

Ethan Frank Ball, Civil Engineering.

Nai Kim Bee, Chemistry.

I. A New Method for the Determination of Zinc; A New Method for the Determination of Mercury.

J. Allington Bridgman, Chemistry.

I. P. T. X, Diagram of System $NaNO_3 - NH_3$.

Yuen Ren Chao, Mathematics and Physics.

Merritt James Davis, Assistant in Chemistry, Chemistry.

I. Electrolysis of Salts of Rare Earths.

Clark Munroe Dennis, Chemistry.

I. The Extraction of Radium and the Measurement of Radio-Activity.

Oscar Roelef Elting, Civil Engineering.
Archibald Mortimer Erskine, Chemistry.
I. Fractional Electrolysis of Solutions of the Rare Earths.
Ralph Waldo Green, Assistant Plant Breeding; Mrs. A. W. Smith et al.
P. Naturalizing Tropical Fruits.
Earle Winthrop Hall, Civil Engineering.
Charles Ernest Hayden, A.B., Instructor in Veterinary Physics, Physiology (Vet.)
P. The Diastases in the Saliva of the Dog and Cat.
Ralph Howe; R. C. Carpenter et al.
P. A Study of the Hydration of Portland Cement. (Thesis.)
I. The Coefficient of Friction of Wood on Cast Iron at High Speeds.
Minfu Tah Hu, Mathematics and Physics.
Milton Jaret, Civil Engineering.
Alfred Oberle, Physiology and Biochemistry.
I. The Composition of the Urine of the Horse and the Cow upon Standard Diets.
Herbert Bowman Pope, Civil Engineering.
Uldric Thompson, Jr.; R. C. Carpenter et al.
Victor Herman Werner, A.B., Civil Engineering.
Charles Smith Whitney, Civil Engineering.
Louis Isaac Zagoren, Civil Engineering.

ALUMNI

Willis Haviland Carrier, M.E. (1901).
P. Numerous papers relating to the Determinations of Humidity. C. The Specific Heat of partly saturated Air; the Removal of Dust from Air; Investigations Relating to Blowing Fans, etc.
Herbert Chase, M.E. (1908).
P. Several papers relating to Automobile Research. Testing Automobile Engines, etc.
Wilson Gardner Harger, C.E. (1905).
P. Handbook for Highway Engineers. (Joint author.)
William Glenn Hoyt, C.E. (1909).
P. The Effects of Ice on Stream Flow.
Charles Lathrop Parsons, B.S. in Chem. (1888), D.Sc. (Maine, 1910).
P. Chrystalography, Mineralogy, and Blow Pipe Analysis. (Joint author); Beryllium: Its Chemistry and Literature; numerous papers.

John Cutler Shedd, A.B. (Princeton, 1891), M.S. (Cornell, 1892), Ph.D. (Wisconsin, 1899).

P. Interferometer Study of Radiations in Magnetic Fields; Elastic Modulus and Elastic Limit of Rubber and Their Relation to Change of Temperature; Radioactivity of Mineral Springs of Manitou, Colo.

Jacob Traum, D.V.M. (1905).

P. The Clinical Examination of the Blood of the Dog (joint author); Infectious Abortion in Cattle (joint author); (numerous publications in circulars of the Bureau of Animal Industry).

Ezra Bailey Whitman, C.E. (1901).

P. (Numerous publications on Sewage Disposal, Water Supply, and Filtration Plants.)

A program committee of four arranges in advance a program for the year. An entertainment committee directs the social activities which usually follow the scientific meetings. A committee of 15, representing all departments and colleges, scrutinizes the qualifications of the candidates proposed for election. Election to membership is held late in the year so as to allow as much time as possible for the completion of research.

F. K. RICHTMYER, *Recording Secretary.*

THE MICHIGAN CHAPTER

At the last regular meeting of the Michigan Chapter, held at the Michigan Union on Thursday evening, May 28, the annual banquet was served and thirty newly elected members were initiated into the Society. The address on this occasion was delivered by President W. C. Hoad on Some Recent Observations Regarding the Effects of Water Purification. Of the thirty newly elected members four are connected with the instructional staff of the University, one is a non-resident alumnus, fifteen are resident graduate students, and ten are undergraduates. Seven of the ten are undergraduates in the Engineering department, two in the Literary department, and one in the Pharmacy department.

With a view of defining more clearly the qualifications for membership in the local chapter, particularly with respect to the elections from the undergraduate body, the Michigan Chapter at the regular December meeting resolved that the following undergraduates and no others shall be eligible to active membership in the chapter: (d) "any undergraduate in the fourth year class, or else in the class substantially equivalent thereto, who has shown marked

ability in the prosecution of some piece of work, done either independently or as a collaborator, or has shown evidence of originality in the solution of intricate problems, and power to do constructive work with experimental data. All candidates must be vouched for by two or more active members of the chapter." As a result of the strict interpretation of this ruling the number of undergraduates elected was this year the smallest in the history of the chapter.

INITIATES

FACULTY

Charles August Behrens, Ph.D. (Medicine).

Ph.C 1907, B.S. 1909, M.S. 1910, Ph.D. 1913. All degrees from the University of Michigan. Instructor in Bacteriology in the University of Michigan.

Published: An Attenuated Culture of Trypanosoma Brucei, Journal of Infectious Diseases, 1914.

Joseph Stanley Laird, Ph.D. (Chemistry).

A.B., University of Toronto, 1909; Ph.D., Princeton University, 1912. Holder of the Victoria College Gold Medal in Science, 1909; fellow in chemistry, Princeton, 1909-10, 1911-12; assistant in chemistry, Princeton, 1910-11. At present instructor in chemistry in the University of Michigan.

Published: Occlusions in Electrolytic Silver and their Effect on the Electrochemical Equivalent of Silver. The Electrochemical Equivalent of Cadmium.

David Martin Lichty, Ph.D. (Chemistry).

M.S. Univ. Michigan, 1891; Ph.D. Heidelberg, 1906. Assistant professor of General Chemistry.

Published: An Introductory Study of the Influence of Substitution of Halogens in Acids, upon the Rate and Limit of Esterification, Am. Chem. Jour., 17, 27 (1893); Esterification of Halogen Acetic Acids, ibid., 18, 590 (1894); Esterification and Conductivity of α-, β-, γ-, and Σ- halogen fatty acids, Annalen, 319, 369 (1901); Solubility of Chloride, Bromide and Iodide of Lead, Jour. Am. Chem. Soc., 25, 469 (1903); Action of Sulfuric Acid on Oxalic Acid, J. Phys. Chem., 11, 225 (1907); Absolute Sulfuric Acid, J. Am. Chem. Soc., 30, 1834 (1908); Properties of Sulfur Trioxide, ibid., 34, 1440 (1912).

Udo Julius Wile, A.B., M.D. (Medicine).

A.B. Columbia University, 1904; M.D. Johns Hopkins University, 1907. Instructor of Dermatology and Syphilology, New York Post Graduate Hospital and Medical School, 1909-11. Professor of Dermatology and Syphilology, Department of

Medicine and Surgery, University of Michigan. Honors: Member of the American Dermatological Association. Member of the Chicago Dermatological Society. Member of the Detroit Society of Neurology and Psychiatry. Corresponding Member of the Manhattan Dermatological Society. Fellow of the New York Academy of Medicine. Associate Editor of Dermatologische Wochenheft.

Published: Ueber Komplementbindende Stoffe in Harn Syphilitischer, Berl. Klin. Woch., 1908; Das Eleiden der basalen und superbasalen Hornsicht, Monatschrift f. Prackt. Dermat. 1908; Ueber Granuloma Pyogenicum, Festschrift fuer P. G. Unna, Dermatologische Studien, 1910; Sarcoid Tumors of the Skin with Report of a Case of the Boeck Type, Jour Cut. Dis., July, 1911; Xanthoma Tuberosum Multiplex, Dermat. Woch., 1912; Gummata of the Superficial Lymph Glands with Report of a Case, Archiv. fuer Dermat. u. Syphilis, 1912; Arsenical Cancer with Report of a Case, Jour. Cut. Dis., Apr. 1912; Role of Anaphylaxis in the Relation of the Skin to Disorders of the Gastrointestinal System, Med. Rev. of Revs., 1912. Numerous other publications.

NON-RESIDENT ALUMNUS

Marion Den Herder Kolyn, B.S. in Civil Engineering University of Michigan, 1909. Bridge Detailer, American Bridge Co., 1909-10; Bridge Designer, Michigan Central R. R., 1910-12; Bridge Designer, C. M. & St. P. Ry., 1912-13; Bridge Designer, C. & A. R. R., 1913-14; Bridge Designer, C. M. & St. P. Ry., 1914.

Line of research work: Reinforced Concretè Arches and Trestle Abutments.

RESIDENT GRADUATES

Herbert John Cutler, B.Ch.E. University of Michigan, 1913. Candidate for M.S. in Engineering. Assistant in Chemical Engineering in the University of Michigan.

Research: Properties of Copper-Zinc Alloys.

Paul Henry deKruif, B.S. University of Michigan, 1912. Candidate for Ph.D. Assistant in Bacteriology.

Research: Immunization against Trypanosome Infections.

James Wightman Follin, B.C.E. University of Michigan, 1913. Candidate for M.S. in Engineering. Teaching Assistant in Civil Engineering.

Research: Slate Filter Beds as a Preliminary Process in Sewage Purification.

Alfred Alford Griffin, A.B. University of Kansas, 1912. Candi-

date for M.S. in Forestry. Laboratory Assistant University of Kansas, 1912; Field Assistant, Forest Service, 1910, 1011, 1913.

Research: Run-off from Bare and Forested Water-sheds in Colorado; Growth of Basswood and Hemlock.

Stacy Rufus Guild, A.B. Washburn College, 1910. Candidate for M.A. Student Assistant in Chemistry, Washburn College, 1909-10; Teaching Assistant in Histology, University of Michigan, 1912-13; Instructor in Histology, University of Michigan, 1913-14.

Research: Observations on the Peripheral Distribution of the Nervous Terminalis in Mammalia, Anatomical Record, 1913. (Jointly with G. Carl Huber); Observations on the Histogenesis of Protoplasmic Processes and of Collaterals, Terminating in the Peripheral Sensory Ganglia, Anatomical Record, Vol. 7, 1913. (Jointly with G. Carl Huber.)

Carl DeWitt Hocker, A.B. Wabash College, 1912. Candidate for Ph.D. Teaching Assistant in General Chemistry, University of Michigan, 1912-14.

Research: Condensation of Nitromalonic Aldehyde with certain Ortho-methylenic Groups.

William Vernor Hoyt, A.B. Olivet College, 1911; A.M. ibid., 1913. Candidate for Ph.D. State College Fellow at University of Michigan from Olivet, 1912-13, 1913-14; University Fellowship, 1914-15.

Research: Condensation of Nitromalonic Aldehyde and Glycine Ester.

Willett Forrest Ramsdell, B.S. University of Michigan, 1912. Candidate for M.S. in Forestry. Field Assistant U. S. Forest Service, July, Aug., Sept., 1910; July, Aug., Sept., 1911; July, Aug., Sept., Oct., 1912; Assigned to investigative work, Wind River Experiment Station, Carson, Washington, April, May, June, 1913.

Research: Bearing of Sites and Situations on Natural and Artificial Reproduction.

Samuel Horner Regester, Ph.B. Waynesburg College, 1907; A.M. ibid., 1908; A.M. Columbia University, 1911. Candidate for Ph.D. Professor of Chemistry, Waynesburg College, 1909-11; Assistant in Chemistry, University of Michigan, 1911-12; Assistant in Chemistry, Columbia University, Summer Sessions, 1912,1913.

Research: The Heating Value of Coal.

Myra Melissa Sampson, Ph.B. Brown University, 1909. Candidate

for M.A. Instructor in Zoology, Smith College, 1909-13. Holder of the Traveling Fellowship in Zoology from Smith College, 1913-14.

Research: Some Plants of Tiverton, R. I., Rhodora, June, 1908.

Anton Augustus Schlichte, B.S. University of Michigan, 1909; M.S. University of Michigan, 1910. Candidate for Ph.D. Fellow in Chemistry, University of Illinois, 1910-11; Fellow in Tanning, University of Michigan, 1911-14.

Research: The changes in Skin during its Conversion into Leather.

Carl Louis Schumann, B.S. in Chemical Engineering North Dakota Agricultural College. Candidate for M.S. in Chemical Engineering. Holder of the Acme Paint Fellowship.

Research: The Waters of Richland County, Bulletin jointly with Prof. Darner of the North Dakota Food Commission, Feb., 1911; The Quantitative Determination of China Wood Oil, jointly with E. E. Ware, to be published in the near future.

John Baker Taylor, A.B. University of Michigan, 1913. Candidate for M.S. in Forestry.

Research: Effect of drought on Coniferous Seedlings.

Leslie Osgood Waite, B.S. in Engineering, University of Michigan, 1913. Candidate for M.S. in Engineering. University Fellow in Engineering, 1914.

Research: Solution of Problems in the Design of Direct Current Machinery.

Chester Owen Wisler, B.S. in Engineering, University of Michigan, 1913. Candidate for M.S. in Engineering. Teaching Assistant in Hydraulic Engineering.

Research: Relation between Precipitation and Run-off.

UNDERGRADUATES

Literary Department

Frederick McMahon Gaige, Museum Assistant in Entomology. Field Assistant Michigan Biological Survey, 1908, 1909; Mershon Expedition, 1910; Walker-Newcomb Expedition, 1912; Walker Expedition, 1913. Member of A.A.A.S., Michigan Academy of Science, Brooklyn Entomological Society.

Research: Birds of Saginaw Bay Region, Mich. Geol. & Biol. Surv., Pub. 4, Biol. Ser. 2 (withN. A. Wood); A Nevada Record for the Canada Otter, Science, xxxvii, p. 883 (with A. G. Ruthven).

Robert Harrison Weitknecht. Student Assistant U. S. Forest Service, Sept. 1, 1905, to Sept. 1, 1906. Field Assistant U. S. Forest Service, July 1, 1911, to Oct. 1, 1911; July 1, 1912, to Oct. 1, 1913.

Research: Growth Study of Western Yellow Pine in Oregon; Rodent Injury to Forest Reproduction.

Pharmacy Department

William Lloyd Mitchell, Ph.C. University of Michigan, 1912.

Research: The Hydrolysis under Pressure of Sugar Solutions.

Engineering Department

Edmond Wharton Conover (Mechanical Engineering).
Wihtred Cook (Civil Engineering).
Gerhardt Louis Luebbers (Mechanical Engineering).
Floyd Liddon Moon (Electrical Engineering).
Albert Roth (Civil Engineering).
Chester Seitz Schoepfle (Chemical Engineering).

Research: Additive Compounds of Triphenylmethyl.

Byron Henry Stuck (Mechanical Engineering).

Research: Coefficient of Friction of Air flowing in Galvanized Iron Ducts.

WALTER F. HUNT, *Secretary.*

THE RENSSELAER CHAPTER

During the past year four business meetings have been held, and on May 1 an open meeting, when an illustrated lecture was delivered by A. L. A. Himmelwright of New York on The Life Hazard in High and Crowded Buildings. Mr. Himmelwright, who is one of the early members of the Rensselaer Chapter, has devoted most of his time during the past few years to the study and solution of problems involving safety to life in buildings.

At the March meeting the following members were elected:

FACULTY

Dr. John M. Clarke, Professor of Geology and Mineralogy; New York State Geologist.

UNDERGRADUATES

E. C. Berndt.

An Investigation of the Economical Grade Line for an Electric Railway between Warrensburg and Chestertown, N. Y. Thesis for C.E.

D. R. Cather.

Design for a Steam Electric Power Plant, 2000 K. W. capacity. Thesis for C.E.

C. E. Davies.
An Investigation of the Flow of Water in Open Channels of Varying Cross Section. Thesis for M.E.

C. B. Gibson, Jr.
Design for a Single Track R. R. Lift Bridge, 150 ft. Span. Thesis for C.E.

Valentine Godard.
Design for a Double Track Through Bascule R. R. Bridge, 115 ft. Span. Thesis for C.E.

W. M. Healy.
Design for a Double Track Swing R. R. Bridge, 330 ft. Span. Thesis for C.E.

A. L. Hyde.
An Investigation of the Resistance to Motion of Submerged Bodies. Thesis for C.E.

D. H. Kinloch.
Design for a Double Track Three-Hinged Steel Arched Railway Bridge, Span 200 ft. Thesis for C.E.

R. E. McCorkindale.
Design for a Reinforced Concrete Arch Highway Bridge, Span 180 ft. Thesis for C.E.

F. E. McMullen.
Determination of the Coefficient of Conduction from Air to Water through Steel and Brass Pipes. Thesis for M.E.

W. A. McMullen.
Design for a Reinforced Concrete Warehouse for the Municipal Terminal at Tampa, Fla. Thesis for C.E.

Agustin Padron.
Determination of the Economic Speed and Design for the Propeller for an 11000 ton Freight Steamer. Thesis for M.E.

P. C. Rummel, Jr.
Design for the Electrical Equipment of a Hydro-Electric Development, Province of Santa Clara, Cuba. Thesis for E.E.

J. C. Vosburgh.
Design for the Steel Skeleton of a Twenty-Story Office Building. Thesis for C.E.

H. F. Wilson.
Design for the Electrical Equipment of a Heroult Furnace Plant for the Refining of Steel. Thesis for E.E.

EDWARD F. CHILLMAN, *Secretary.*